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MUS MUSCULUS VAR. *M. NUDO-PLICATUS.*

By Archibald Campbell.

(Plate I.)

In May, 1904, when in the shop of a local dealer, my attention was attracted to four Mice of this description. On making enquiries, I was told that they had been bought that morning from a man who said he had come from Australia, but my informant knew nothing more.

Of the four—one was a full-grown male, slightly smaller than a common wild Mouse, and the other three—two males and a female—looked, from their size, about six weeks old. They were all entirely naked, and the whole body a mass of wrinkles; in the old male especially they were very thick, and the skin formed a kind of flap which extended along the sides between the upper part of the legs. There was a thick fold of skin across the shoulders, and over the back behind the ears. On the face the wrinkles were very thick above the eyes—which were almost closed by the thick skin-folds above them—down the nose, and on each side of the mouth. The belly was also very wrinkled, the skin forming a cavity out of which the legs came. All trace of hair on the body was gone with the exception of a few dark coloured vibrissæ, which they all had, but the young ones still retained a few hairs on the legs and at the base of the tail. The corrugations on these were less pronounced than on the old one, but with them the belly was quite smooth, though they had the fold of skin on the sides. The eyes were about the ordinary size, and the wrinkles had not developed enough to obscure their vision. In colour they were a dull white, with black eyes and dark ears and tail. They were to all appearance perfectly healthy, and, until they became blind, were as active as ordinary Mice. Two of the males died shortly after I had them, and the female, though she lived for some months, never bred.

After running the old male with two albino females I obtained a litter from each—one litter consisting of three, and the other of a single young one. These four Mice—a male and three females, the progeny of hairless and albino—were exactly like normal wild Mice in every respect. The male only had a small white spot on the face and belly. He was particularly large and healthy, and lived to be nearly two years old.

The result of crossing these wild coloured Mice, *inter se*, and their offspring again, produced normal wild, black, white, black and white, wild and white, and twenty-seven of this "corrugated hairless" type. These hairless were all for the first fortnight of their existence exactly like normal Mice, *i. e.* born blind and naked; then the hair grew, and the eyes opened—and, in fact, it was impossible from a litter of that age to pick out the individuals which would eventually develop these corrugations in the skin.

When from three to five weeks old—for some took longer than others—they began gradually to lose their hair. The nakedness begins about the eyes and on the belly, then shows on the back and head, and gradually spreads over the body until they are perfectly nude, which usually occurs when they are between two and three months old. These corrugations are quite visible on the skin as soon as the nakedness appears, and gradually, as the animal grows older, the skin-folds and wrinkles become thicker, until the eyes are completely closed by the thick skin above them. In colour, twenty-two out of the twenty-seven corrugated which I bred were the usual wild shade before they became hairless, four were black then hairless, and one was a pure albino, with pink eyes and white ears and tail.

With reference to the article by Gaskoin in the Proc. Zool. Soc. 1856, p. 38, plate—from which I have taken the name *Mus*

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nudo-plicatus—he states that four corrugated hairless Mice, including a pregnant female, were caught at Taplow. Two of these died, and eventually the female " brought forth five young ones," two of which died, and the other three were reared, but did not breed. This appears to be the only recorded instance that I can find, of a corrugated female breeding in captivity. It was most unfortunate that none of the hairless females that I raised ever bred. Again, as to the question of age, he remarks in the same paper that these Mice were four months in the possession of a man "Bond," and six months in his; whereas five months and a half was the longest life of any of mine, and thirteen of them died when about two months old or less.

The plate also shows two large, full-grown, corrugated Mice, with bright black eyes; and any of mine that lived to be three months old were by that time almost if not totally blind; so much so, that on several occasions they overran the edge of the cage, apparently without seeing it.

I have quoted from this article to show where my specimens differed from the Mice he possessed.

All the photographs were taken from living specimens.

Fig. 1.—Six weeks old.
Fig. 2.—Three months old.
Fig. 3.—Four months old.
} Showing corrugations on belly at these ages.

Fig. 4.—Three weeks old. Hair coming out round eyes.

Fig. 5.—Three weeks old. Nakedness showing near eyes, between the ears, and on back.

Fig. 6.—One month old. Corrugations showing under the hair.

Fig. 7.—Six weeks old. Hair at base of tail, and on head and legs. Eyes still open.

Fig. 8.—Four months old. Quite blind, and corrugations very thick.

Fig. 9.—Seven weeks old. In this example the eyes are shut on account of the light, and not from the skin near them.

THE ENCYSTMENT OF *MACROBIOTUS*.

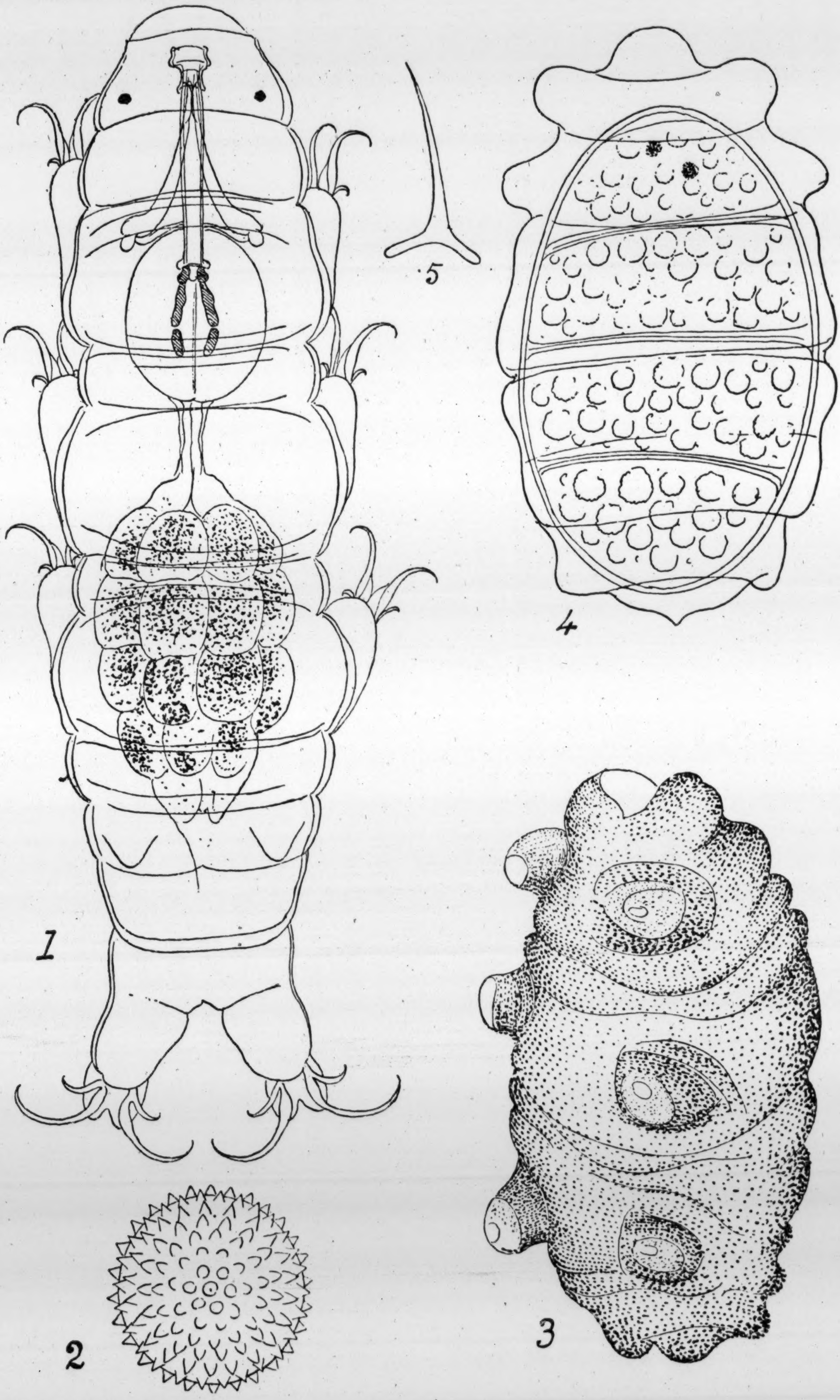
By James Murray (Biologist on the Lake Survey under Sir John Murray).

Many of the smallest animals, in common with some of the largest, experience regularly at some period of the year unfavourable conditions which threaten the destruction of the individual and the extermination of the race. This fate is avoided by one of two means—either the individual perishes, and the race is saved by the production of what are called winter-eggs or resting-eggs, or the individual protects itself in some way, and lies dormant till better times, or, as it is called, hybernates.

It is usually the cold of winter which constitutes the threatening condition, hence the terms winter-egg and hybernation; but it may be quite the converse, and it may be the heat or drought of summer which has to be guarded against. Similar means of protection may be used against either evil. Many resting-eggs are laid in summer, and many animals, including Water-Bears and Bdelloid Rotifers, lie dormant during droughts. Using the term in the wider sense to cover all means taken to tide over untoward seasons, large numbers of animals hybernate—Bears, Tortoises, Water-Bears, Bdelloid Rotifers, Nematodes, &c.

Bdelloid Rotifers resist desiccation by coating themselves with an air-proof varnish. Water-Bears (or Tardigrada) are equally well protected against desiccation, though the means by which they protect themselves are not understood. There is no coating of varnish in this case. The Bears are found among dry moss, rigidly extended as though in *rigor mortis*, but they quickly revive when placed in water.

The process now to be described is of a totally different kind. Its occurrence at the beginning of winter suggests that it is a sort of *hybernation*; the profound changes in the organization of the animals which characterize it suggest the name *encystment*.



J. Murray del. ad nat.

MACROBIOTUS DISPAR, n. sp.

For some years I have frequently seen, in the moss-washings where I seek for Water-Bears (Tardigrada), little yellow elliptical or sausage-shaped packages, from which I could squeeze out animals of the genus *Macrobiotus*, in a quiescent state, but alive. I thought to connect these in some way with imperfect moults, but the packages differed from the moulting animal in that the yellow skin tightly enclosed the animal within, suggesting a comparison with pupæ, or with mummies, and there were no limbs on the outer skin. The origin of these curious bodies was quite unknown, and the matter rested thus till I had recently the good fortune to watch the process of formation in one species which abounded in a shallow pond near Glasgow.

The species observed was long supposed to be *Macrobiotus macronyx*, but the eggs have recently been found, and as these are spiny and are laid free, while those of *M. macronyx* are smooth and are laid in the moulted skin, the species would have to be placed in a different section of the genus. Prof. Richters agrees that the species is one hitherto undescribed, and I now give a description of it:—

MACROBIOTUS DISPAR, n. sp. (figs. 1 to 5).—Large, hyaline, with yellow or brown stomach. Eyes dark. Claws of each pair very unequal, one very large, the other very minute, the disproportion less in those of the last legs. Pharynx large, shortly oval; thickenings three in each row—first a nut joined to the gullet, second a long narrow rod, third a rod half as long as the second. Teeth curved, with very wide furca. Eggs spiny, laid free; spines little sharp cones, separated by interspaces about equal to the diameter of the cones. Length up to 600 μ; pharynx, 80 μ long; larger claws, 48 μ long; diameter of egg, over spines, 90 μ. There are generally two large conical processes on the back (fig. 1), between the third and fourth legs. These are variable, and may be apparently quite obsolete. There appears, however, to be always some trace of them when the animal moults.

This species was supposed by Prof. Richters to be *M. macronyx*, which the adult closely resembles, and under that name I have recorded it in various papers. That species lays smooth eggs in the moulted skin, and has not the conical processes so frequent in *M. dispar*.

Pond at Nerston, near Glasgow, 1904; Loch Tay, 1905; pond near Edinburgh; Shetland; Franz Josef Land; Spitzbergen.

Encystment. — The eggs of *M. dispar* appear to be very rare. They have only been seen on three occasions, and only once was the embryo seen in the advanced stage of development which led to the discovery of its connection with the adult animal.

While carefully searching for eggs in a very abundant collection of the animals from the pond at Nerston, I noticed many little dark-coloured skins, bearing six stumps of limbs without claws, which, to my surprise, proved to belong to the *Macrobiotus.* I was thus led to study them carefully, and observed the remarkable series of changes which I now recount.

Most of the animals appeared to be moulting; the normal, smooth, transparent skin was loosened, and the animal in its new skin could be seen moving inside. This may be regarded as an ordinary moult, as many emerged from the old skins, and continued the metamorphosis outside. Very often, however, the whole process took place within the original skin. After this moult the skin of the animal differs from the original skin—it is yellow and punctate, while the old skin is hyaline, colourless, and smooth. The new skin appears also to be viscous dorsally, as there is generally much extraneous matter adhering to the back, which becomes of a rich umber colour. Gradually it contracts, till it is little more than half its original length, but remains relatively broad; it assumes a definite form (figs. 3 and 4), only slightly reminiscent of the adult form; the colour darkens till it becomes grey, purple, or well-nigh black; finally it becomes quite rigid, with brittle shagreened skin, and six little stumps of legs, without claws (fig. 3). This I call the *outer cyst.* The last legs have been drawn in before the hardening of the cyst, so that they do not show conspicuously like the others, and the claws of the other legs have also been withdrawn. If one of these cysts is squeezed shortly after its formation it breaks up and reveals a normal adult, having all the usual organs—claws, pharynx, teeth, stomach, eyes, &c. If it is examined at a somewhat later period it is found that it contains, instead of the adult animal, an elliptical, thick-skinned, yellow body (fig. 4), which I call here the *inner cyst.*

This inner cyst is smooth, and has no trace of limbs. It is considerably less in size than the outer cyst, in which it lies loosely. Just after it is formed it contains a complete animal, possessed of all the normal organs. This may be squeezed out, and may be seen to move feebly.

When a large number of cysts were broken up, after the lapse of about a week from their first observation, it was found that a large proportion of the inner cysts had undergone further change. The cyst no longer contained a complete animal. Most of the conspicuous organs had disappeared—claws, pharynx, teeth, &c.—and the animal would not have been recognized as a Tardigrade had its antecedents not been known. Only the pigment-spots, commonly called eyes, and the fat-cells in the blood were recognizable. There was a faint segmentation within the cyst, three transverse furrows dividing the body into four nearly equal parts. The pigment-spots were very diffuse.

The animal contained in the inner cyst is so unlike a Tardigrade that I have entertained the idea that it might be some parasite—possibly a Turbellarian or other worm. The complexity of the series of changes by which the final cyst is produced, the constant form and size of the outer cyst, and the presence of all the organs till the last stage is reached—all tell against the theory of parasitism, and lead to the conclusion that we have to do with a normal process in the life-history of the animal.

What may be the meaning of these remarkable changes we need hardly attempt to guess till the further stages have been observed. Cysts of other species have been seen, in which there were active animals which I supposed were about to emerge, but in view of the history of *M. dispar*, partly traced above, we may rather suppose that these cysts had just been formed, and that the process of simplification had not yet taken place.

Till the full history is known it will remain inexplicable why the double moult should take place, the animal at each moult assuming a different form; and, finally, why the individual should undergo such a profound simplification. The curious outer cyst may be regarded not as the result of a moult, but as the product of a secretion from the skin. Fragile though it is, it may be a sufficient protection to the inner cyst against the only enemies likely to be attracted by Water-Bears.

Extraordinary though it may appear that an animal so high in the scale as an Arthropod should lose all its internal organs in the course of encystment, a well-known phenomenon in the same group (Tardigrada) supports the belief that this really happens. Nearly all species of *Macrobiotus* are known to have what Richters calls "simplex" forms. The teeth in these are reduced in size, and the rods in the pharynx are absent. Prof. Richters appears to have seen no further simplification, but in Scotland it is common for the whole alimentary canal in front of the stomach, with all its adjuncts, to be absent. There is no mouth, no gullet, no teeth, but some trace of the pharyngial bulb usually remains. We find large, strong, active animals whose stomachs appear distended with food, yet which possess no organs for imbibing food. No conclusion seems tenable but that reduction must have taken place since the food was imbibed, but this explanation is itself inexplicable, and we are further puzzled when we find that some eggs produce simplex forms.

The applicability of the term "encystment" to the process which has been described may be questioned, but the word "cyst" well describes the bodies formed; and, moreover, the formation of outer envelopes, within which the whole substance of the animal passes into an apparently simpler condition, offers sufficient analogy with encystment as we find it in the Protozoa to justify the adoption of the term.

The formation of the cysts was going on in the beginning of winter, in October and November. This may indicate that it is, like the production of winter-eggs by various animals, a means of preserving the species through the rigours of winter.

M. dispar is the only species in which the complex process has been traced so far as the simplex form within the inner cyst. Cysts similar to the inner cysts of *M. dispar* are known in several species. Among moss brought by Mr. W. S. Bruce from Spitzbergen in August, 1906, and examined in September, there were many cysts which were shown by the pharynx and claws of the contained animal to belong to *M. echinogenitus*, Richters. More recently the formation of the cyst of this species has been seen in examples from a bog-pool in Scotland. There is no outer cyst like that of *M. dispar*. The cyst formed within the moulted skin resembles the inner cyst, and contains a complete animal. The reduction to the simplex state has not in this instance been seen.

M. dispar is one of the few Tardigrada which have their usual habitat in ponds. It is also the most boreal of known species, as it was found at an elevation of several hundred feet in Franz Josef Land by Mr. Bruce. Whether it is exclusively a northern species remains to be seen. At present its southern known limit is Scotland, but, in view of the close resemblance of the adult animal to *M. macronyx*, I suspect that some of the records made under that name really refer to *M. dispar*.

In this country it lives in ponds liable to freeze in winter, occasionally at the margins of lakes, and it may be that the encystment is correlated with its life in permanent waters. The case of *M. echinogenitus*, cited above, suggests the possibility that species which normally live in moss may be induced to form cysts when they find themselves amid the different conditions of a pond.

The publication of these observations in their incomplete state is made in the hope that other students of the Tardigrada may interest themselves in the "encystment," and that we may thus hope for an earlier solution of the problems involved.

EXPLANATION OF FIGURES (p. 5).

1. Adult, dorsal view, showing the conical processes.
2. Egg.
3. Outer cyst, showing shagreened surface, and legs.
4. Inner cyst, shown within outline of outer cyst; dorsal view.
5. Tooth, showing the very wide *furca*.

(All the figures are drawn to the same scale.)

Since writing these notes I have received from Prof. Lauterborn an interesting little paper, in which he describes a similar encystment of *Macrobiotus macronyx* (Verhand. d. Deutsch. Zool.

Ges. 1906, p. 267). Prof. Lauterborn's observations differ from mine in many respects, and it may be that the cycle of changes is not identical in the two species. It is curious that these two species, which are believed by Prof. Richters to very closely resemble each other, yet differ profoundly in the details of reproduction, as shown by the recent discovery of the spiny eggs of *M. dispar*. Prof. Lauterborn also refers to this remarkable process as *encystment* (Encystierung). Both *M. macronyx* and *M. dispar* live in ponds, and we might find in this the cause compelling to the encystment, but *M. echinogenitus*, which also encysts, is not especially a pond-dweller.

PROVINCIAL NAMES AND RESORTS OF CERTAIN BIRDS IN THE SOUTH OF SCOTLAND.

By J. R. McClymont.

The Blackbird is the most abundant of the birds which are *par excellence* singing-birds in that part of Roxburghshire which is situated between the Teviot and the Rule. Although it has several provincial names, not one of them is Lowland Scotch, for *Blackie* cannot be accounted a provincial name. The love-song of the *merle* is not easily forgotten. It consists of a series of crisp and harmonious phrases rendered with great precision and distinctness from a lofty branch. The pauses in the song are no less eloquent than the melody, and constitute an essential difference between its lay and that of other songsters of the fields and woods.

The Chaffinch is, next to the House-Sparrow, the most plentiful of the resident Finches; large parties of them are often to be seen in autumn and early winter, picking up a livelihood on country roads. The Chaffinch is called the *Shelfie* in the south of Scotland. The word is probably an abbreviation of *sheldapple*, and *sheldapple* is compounded of *sheld* and *dapple*; the name was doubtless bestowed on the Chaffinch because of the variety of colours in the body-plumage, and of the speckling on the wing-coverts of the male. In captivity I have found Chaffinches to be sprightly and intelligent birds, playful when two are together, assiduous bathers, much given to prying into every corner of their habitation, and keenly observant of their owner's movements.

In the southern Scottish counties the Sky-Lark begins to sing in April, and sings till August. In these counties, "If the lift were to fa' the laverocks wad be smoored" is a proverbial saying which is often quoted. It is, I think, not quite certain that the words *lark* and *laverock* have a common origin and history. *Laverock* has, I believe, been traced to an Icelandic word *lava*, which signifies *lark*, and also *bird* in general, as if the Lark was the typical bird in Iceland; perhaps *lava* is connected with *lavy*, which is one of the names of Guillemots in St. Kilda. If so, we have an illustration of the fact that closely allied bird-names designate different birds in different languages. *Lark* is traced to the Anglo-Saxon word *lawerce*. Its remoter origin is, I believe, unknown.

Those who have wandered through the environs of Edinburgh know the woods to the south of Blackford Hill, which, with the return of May, the Cuckoo reanimates with mellow notes. At the base of the range of the Pentland Hills, Cuckoos are not uncommon. In that locality they place their eggs in the nests of Meadow-Pipits, and the young Cuckoos check the numerical increase of those birds. "You breede of the Gowk you have ay but one song" is a word of caution addressed to persons who always harp on one string. *Gowk* appears to be a word of the same origin as *gawk*—a simpleton or a clumsy person—and *gawky*. *Gauche*, and even *cuculus* and *cuckoo*, may be derived from the same root as *gowk*. That root, I believe, is not known, but, from the meanings of the derivatives, we may deduce the meaning of the root to be *left*—the contrary of *right*. The Cuckoo may have received the name *gowk* because it was supposed to be so clumsy that it could not build a nest. An allusion to its annual reappearance in spring may be found in the selection of the first day of April as All Fools' Day, and the expression "Hunt the Gowk," and the custom to which that expression refers, may contain an allusion to the alleged practice of prospective or possible foster-parents who are said to hunt adult Cuckoos from the vicinity of their nests. We are reminded by the custom of those games in which certain Australian tribes imitate the movements of wild animals.

From a shady dell watered by a small affluent of the Teviot, I have often heard the cooing of Wood-Pigeons. They are generally distributed throughout the southern counties of Scotland, in wooded localities, and "especially near the Moorfoot Hills, where they formerly nested (and perhaps still nest) in scores on the low branches of young larches and Scotch firs. In autumn they disappear from that locality. Their food consists chiefly of the seeds of docks and charlock, and of clover-leaves" (A. R.

Reid). Their name *Cushat* was with us contracted into *cushie*, and I have also heard *cushie doo*.

The Lapwing is called the *Peeseweep* in Roxburghshire ; it is the most common limicoline bird in that county, whilst in the adjacent county of Selkirk the Curlew is more common. Lapwings may be observed during the summer on unreclaimed land, and on hill-pastures, at an elevation of from 1000 ft. to 1500 ft. above sea-level, between the Rule and the Jed. Curlew frequent the hills which enclose the valley of the Yarrow—low, grass-covered, and almost treeless hills, on which Cheviots and other small sheep are depastured. The cries of the *whaups* are singularly in unison with the monotonous and solitary uplands in which they pass the spring and summer. An adage which runs "There's a whaup in the raip" is almost unintelligible when written thus ; but if we write it " There's a whaup in the rape,' the meaning becomes clear at once.

In winter Black-headed Gulls (which nest in inland places) may be seen in localities at least thirty-five miles inland. If, as is probable, they follow the courses of rivers—such as the Tweed and its tributaries—the length of their journey is much more than thirty-five miles. These Gulls are called *pick-maws*, a compound word in which *pick* may be connected with *pica* and *pie* ; *maw* is said to be a variant of *mew*. Thus the whole word may signify " pied gull," and may have originally been employed to denote Black-backed Gulls, especially *Larus marinus*, and have been transferred to the Black-headed Gull.

I am indebted to Mr. Arthur R. Reid (Hobart), formerly a resident of Easter Duddingston, near Edinburgh, for the particulars which follow relating to the local distribution of certain species. Mr. Reid's communication relates to the eleven years extending from 1877 to 1887, and it is, of course, possible that some of the localities mentioned in it are no longer frequented by the species herein named :—

Mr. Reid observed Ring-Ouzels in Peeblesshire and Midlothian on various occasions during the period which I have defined ; Stonechats in the latter county ; Goldcrests frequently in Bute, and occasionally in Midlothian ; Spotted Flycatchers at Easter Duddingston, where, in 1887, they were plentiful, and were seen nesting; Tree-Creepers frequently, and Tree-Sparrows and Bramblings occasionally, in Midlothian; Twites on the Pentland and Eildon Hills; Reed-Buntings rarely, and Snow-Buntings with some frequency, in Midlothian; one pair of Ravens on the Moorfoot Hills; Hooded Crows near Musselburgh; Wood-Larks nesting near Portobello, and, near Melrose, two Green Woodpeckers. Wigeon and Common Scoters frequent the Mussel Scaup near Musselburgh in winter; Rock-Pigeons nest on the coast of Haddingtonshire; Ringed Sand Plovers, Dunlins, Common Redshanks, and Greenshanks are plentiful on the southern shore of the Firth of Forth in winter, and Mr. Reid found a nest of the Common Redshank in Strathallan, in Perthshire, in 1884. The same observer shot a Purple Sandpiper on Craigentinny meadows between Leith and Portobello, and has seen a few Whimbrels at the Mussel Scaup, and Sandwich and Little Terns in the same locality. Three Great Northern Divers were shot in the Firth of Forth, near Portobello, in 1883, by Mr. E. Johnston, and a Great Crested Grebe has been shot on Duddingston Loch.

Of birds which are not known to nest in Britain, Mr. Reid has seen Fieldfares, Mealy Redpolls, and Firecrests in Midlothian, and the last-named birds in Bute also; a Firecrest was shot near Musselburgh in 1885 by Mr. W. Logan. Golden-eyed Ducks have been seen frequently at the Mussel Scaup; a Grey Plover was shot by Mr. Reid near Dunbar in 1887, and a Turnstone—one of a flock of about twenty—was shot near Musselburgh in 1885. Jack-Snipe and Bar-tailed Godwits have been observed in the same locality on several occasions.

I add a few corrections to my paper on "Names of Birds of uncertain Origin or Meaning" (Zool. 1906):—Page 272, line 11 and line 17, instead of "*alcatroz*" read "*alcatraz*"; p. 273, line 3, instead of "ductus" read "Auctus." In order to make the meaning clearer, read "moreover" instead of "however" in line 17 on p. 272.

Hobart, Tasmania.

HABITS AND DEVELOPMENT OF THE YOUNG OF THE SPOTTED SALAMANDER (*SALAMANDRA MACULOSA*).

By G. T. Rope.

Though I have for years kept a few of these handsome and interesting batrachians, they have never, except in one instance, produced young ones until this summer, when a number of tadpoles were born.

As these were kept under pretty close observation, a slight sketch of their early life may not perhaps be unacceptable to some readers of 'The Zoologist.'

During April I received three adult Salamanders, two of which must, it seems, have been females. They were kept in a vivarium or reptile-case fitted with a zinc tank. The floor was covered with a layer of earth about two inches deep, on which were laid old mossy gnarled stumps and bits of branches, more or less hollow, rough stones, moss, &c. All three animals were in excellent health, and fed well.

On May 3rd I found three tadpoles in the water-tank, and at once removed them to another vessel.

Mr. Bateman, in his excellent and very useful work, 'The Vivarium,' describing the development of the young of this species, says:—"The fore legs of the tadpoles will be produced first, then the hind ones, and, lastly, the external gills are absorbed." Bearing this in mind, and having had but little previous experience of the breeding and development of *S. maculosa*, I was not a little surprised to find that my tadpoles were all born with four legs. They were kept in a large enamelled bowl with a two-inch rim of tin soldered round the edge, and slanting inwards, to prevent their escape; for towards the close of tadpolehood they become expert and persistent climbers, and can easily ascend a smooth enamelled surface, even where it is perpendicular. Their bowl was fitted up as an aquarium, with an island in the middle, and a few plants of frogbit and watercress.

On the 19th another young one was born, and on the 24th three more made their appearance. A further batch of four was produced on the 29th, followed by six more on the 30th. These last were found on land, or rather on wet mud, not in the water-tank, and were at the time all dead except two, which showed signs of life, and, being put into water, soon completely revived.

As there is an interval of nearly four weeks between the birth of the first and last batches, these tadpoles could not have been the offspring of a single mother, and even if two females had a share in their production, it is curious that the whole progeny of each should not have been born at or near the same time, instead of making its appearance in varying quantities at intervals distributed over a considerable period.

I find that, according to my notes, the total number of tadpoles on May 30th was twenty-three; I must, therefore, have omitted to jot down one birth.

This number of young ones being too large for the home prepared for them, some were put into a pond in a plantation near the house. Those retained in the bowl were supplied with food by adopting the ingenious method recommended by Mr. Bateman, *viz.* by procuring from a ditch some water containing minute forms of animal life in abundance, and then, by means of a syphon and some muslin, straining away a part of the water, and using the remainder for feeding purposes. A portion of this was given to the young Salamanders every morning.

On May 18th, there being then only three tadpoles just over a week old, I offered them some very small earthworms, which they at once seized with great eagerness, and in a short time succeeded in swallowing. After this they were supplied with worms whenever any could be found small enough. In taking their prey their motions were exceedingly violent and rapid; in fact, they went at it with headlong fury. They would follow and seize the point of a wire held in front of them, and two of them would sometimes make a simultaneous rush at the same worm, seizing opposite ends. In fact, their behaviour much resembled that of hungry Newts in the presence of their food.

At first it was no easy task to find enough worms small enough for them to swallow, but this difficulty gradually disappeared as they grew bigger.

When first born the young Salamander has a long fish-like body, but after a few weeks it grows stouter, and becomes more distinct from the tail.

These little creatures are very clever at concealing themselves, taking advantage, for this purpose, of the smallest shadows cast by such objects as weeds, stones, &c., and are very fond of lying close alongside some stone or bit of brick, or, if possible, partly under it; acting, in this respect, exactly as the Common Stone Loach does.

On July 2nd I noticed that some of them were beginning to acquire the adult colouring, both colour and markings, however, being at first indistinct, and only suggested, as it were. In fact, it is not until they have left the water, and entered upon a more or less terrestrial life, that the brilliant black and yellow livery is perfected. The change of form from the tadpole to the adult state is rapidly accomplished. The eyes of these creatures during the larval stage of existence are quite small and inconspicuous, but after undergoing their change these organs become large, black, and shining, as in full-grown examples. In spite of the small size of the eyes, however, these tadpoles are remarkably adroit in catching their very nimble prey.

For some days after coming on land the young Salamanders took no notice of worms placed before them, but would occasionally go into the water and feed rapidly on the small living creatures it contained, snapping right and left at those which passed within reach. They did not, however, remain in the water long.

On July 16th two more young Salamanders took to the land, and at that date only two were left in the water as tadpoles. On the 29th one of the latter was resting at the bottom of the bowl, and a small water-beetle about one-fourth of the size of a ladybird was rushing wildly about, going at a great pace. The tadpole made a lightning-like grab at it as it swept past, and caught, but almost immediately let it go again.

On July 20th one young Salamander measured two inches in length.

A handful of chickweed (frequently renewed) was placed on the island, and in this the little animals were almost always to be found, climbing about the labyrinth of moist leaves.

On Aug. 8th the larger of the two tadpoles still living in the water finally left it, and climbed up to the top of the island to hide in the bunch of chickweed. This individual differed in some respects from its fellows. In size it surpassed them all, being nearly double that of the one remaining tadpole. The head was large and wide in proportion to the rest of the body, and, after completing its metamorphosis, this Salamander became of a dull pale yellow tint, with very little black, whereas the rest were brightly coloured, and prettily and distinctly marked. When in the larval state it would sometimes swallow two worms in quick succession, but as its change approached it became very dull and lethargic, refusing worms placed close in front of it.

On the 22nd the last tadpole—a very small one—was first noticed to show signs of entering upon the final stage of existence, the upper surfaces of the thighs having begun to turn yellow. On the 24th the characteristic dark patch between the eyes and the two dorsal rows of yellow spots or patches could be made out, but as yet only indistinctly. By the 29th the upper arms, as well as the thighs, had become yellow above.

On Sept. 3rd this young Salamander, having completed its change, came on land, and concealed itself in the chickweed. After a few days it was placed in the vivarium, to which the rest had already been transferred, and soon afterwards I found them all (the newcomer included) closely congregated together under the same piece of bark. At this period of their lives these little batrachians certainly appear to be socially inclined, for they huddle together in their hiding-places, one on the top of another, like pigs. Yet one or two of mine would sometimes be found lying up singly in a separate retreat.

I have not found any of their cast-off skins, but that the operation was generally performed very soon after the metamorphosis I have little doubt, judging from the sudden change from dull obscurity to great brilliance of colour and distinctness of markings. Before the old skin is shed, and its owner has as yet left the water, there is, as before stated, a faint indication discernible through its semi-transparent substance of the future arrangement of black and yellow markings. In the case of a single young Salamander, born on June 6th, 1889, which acquired the adult form and colour about the second day of August following, the cast-off skin was found on that day *entire* and in the water.

The young animals born during the past summer hardly ever leave their hiding-places to roam about at night, or take a bath, as it is the habit of their elders to do at times all through the winter. They have also taken very little food since October, though up to Nov. 26th, when the smallest of them devoured a comparatively large worm, they have continued to feed occasionally.

The pale yellow individual described above measured, on Nov. 10th, exactly three inches, another of them being only just under that length. Assuming that these two were born on May 3rd, when the first tadpoles were produced, and which is most probable, their age would be just over six months and three weeks, but they may of course have been born later.

On lifting the piece of bark under which they now live, on the evening of Dec. 13th, I found one young Salamander hungry enough to devour a worm offered it. They do not seem to object to the light of a lamp or candle being suddenly thrown upon them, unless the source of light be brought nearer to them than a foot or eighteen inches. They greatly disliked being touched by a beetle which found its way into the vivarium. If, while rambling about, this insect happened to come in contact with one of them, the little Salamander would jerk itself aside as if much annoyed, and make off at a pretty quick pace.

THE OCCURRENCE OF THE GLOSSY IBIS AND LONG-TAILED DUCK IN NORTH DEVON, WITH OTHER ORNITHOLOGICAL NOTES.

By Bruce F. Cummings.

About the beginning of September, 1906, a Glossy Ibis (*Plegadis falcinellus*) was shot on the River Taw near Fremington. I first learnt of the occurrence of this rarity from the Barnstaple taxidermist, who is preserving the bird. It seems that it was shot by a gentleman named Martin, living at Muddlebridge House, Fremington, but unfortunately my efforts in getting any exact details have so far been unavailing. It stands high on the legs, which are greenish black, with long slender toes. The bill is thick and stout, dull black, with the base of the lower mandible yellowish, as in the Whimbrel. The neck is long and slim, of a muddy brown colour, with white speckles. Head coloured ditto. Whole under surface muddy brown. Back, rump, upper tail-coverts, and tail black, with a beautiful greenish gloss. Wings similarly coloured, but more of a dull black, I thought. I believe it was as long ago as 1869 that the last specimen occurred in North Devon.

On Nov. 13th of the same year an immature specimen of the Long-tailed Duck (*Harelda glacialis*) was shot on our river, after heavy weather, off Instow. The two elongated tail-feathers were in this specimen only half an inch beyond the end of the rest of the tail; ear-coverts greyish black, crown of head blackish, forehead black, with a black line running from the base of the bill to the crown. Bill greenish, with blackish tip. Total length, 16 in. When first seen it was by itself on the river in some narrow guts. On being flushed it made for the open river, where it long eluded its pursuer by diving.

This autumn (1906) has been remarkable for the large flights of Terns that have appeared on the estuary from time to time, roughly, between the end of August and end of October. I saw large numbers near Barnstaple, but they did not venture far up the river as a rule. They were mostly, I believe, Common Terns—at all events, those which were shot and shown to me were Common Terns, although, from descriptions given me by fishermen of others shot, a few Sandwich Terns would appear to have been secured. One Little Tern was also shot. I am sorry to say that they were killed in great numbers for ladies' hats, and other reasons equally foolish; a few certainly did escape!

Grey Plovers have also been very common. First seen on Oct. 10th, and at the time of writing (Nov. 3rd) they are still with us, but in diminished numbers.

On Nov. 7th a Hooded Crow, which Mr. W. S. M. d'Urban states to be a rare straggler to this coast, was shot on the Taw near Barnstaple. It is a fine full-grown bird, and is being preserved. It was first said to be a "black and white Rook."

April 1st.—A Mistle-Thrush found with its legs entangled in some wool, with which it was going to build its nest. Since, I have discovered a young Greenfinch hanging to the outside of its nest, with one of its legs caught up in a horsehair-loop. Accidents of this kind to birds which line their nests with wool and horsehair seem to be so frequent that one wonders that their use as nesting materials has not been ere now discarded.

14th.—For several days past I have been watching a pair of Common Wild Ducks courting and nesting among the marram-grass on Braunton Burrows. Peewits nesting in hundreds.

18th.—Saw a fine male Shoveler or Spoonbill Duck. This species was first brought to my notice by a gamekeeper some two years ago. He said he had a couple of "Spoonbills breeding over yonder." Spoonbills! Imagine my surprise. "Have you?" I eagerly asked; "by Jove, they're rare birds." "Yes, sir, they are"; and then, as if attempting to show a little sympathy with my excitement, "and 'tis a beautiful duck." "Duck?" said I; "why, yes, of course, a—er—er—duck!" I have it on good authority that a pair have bred in Devon on a secluded pond for the past three years. On one occasion the female was observed sitting on her nest, so there could have been no mistake. However, this spring no nest has actually been found, but a pair, I have been told, are in the neighbourhood, though I myself have not yet noticed the female. As a breeding bird I believe it is a new species for Devon.

30th.—Yellow Wagtails in large numbers on Braunton Burrows. With us it is only a passing visitor, and not particularly common. Also distinguished one or two White Wagtails near the sea. The Grey Wagtail breeds here pretty commonly, in holes in bridges and walls, &c. During the early morning, amid very grand and imposing scenery, I watched an interesting skirmish between a Peregrine Falcon and a pair of Ravens. *Corvus corax* got served rather roughly. The daring little Falcon, calling angrily, kept stooping, but the old Ravens always managed to flop out of the way somehow. Eventually the Ravens were defeated, but they did not exactly retreat, or surrender—they lazily faced out the fury of the Peregrine, without attempting to retaliate.

May 15th.—A nest of the Short-eared Owl found on Braunton Burrows. Probably a pair breed there every year, but the nest is often destroyed. This is a great pity, for, as is very well known, it is a most useful bird, and a very beautiful one, too. As you approach the nest the hen bird flies off it, and, joining the male, which has by this time put in an appearance, both "bark" and scream and hover over the head of the intruder in a very threatening way. This nest contained seven eggs. The young hatched out, but were taken and apparently killed before they were half-fledged. Ring-Plovers are breeding on all the inland pebble-beaches on the Burrows. I have not found one, this year, on the shore. I obtained a very curious egg from one nest situated on a small mossy mound. Its ground colour is very pale blue, with one big black blotch at the larger end; the rest of its surface nearly spotless. All four eggs in the clutch had this faint blue ground colour, and were somewhat larger than the ordinary Ring-Plover's egg.

28th.—"A white Blackbird seen at Santon" ('North Devon Journal').

29th.—Two Nightjars' nests among the bracken on the sandhills at Santon. Of the two eggs laid by this bird, one is generally larger than the other. Is there any foundation for the statement that the large egg contains a male bird, and the smaller a female? The adults do not vary in size, I believe.

Goldfinches are becoming much commoner in North Devon, according to my observation of the past eight months. This evening I saw a caged Peregrine, which had been found in almost a dying condition beside a dead Pigeon, which it evidently had been tearing abroad. On examination, the feathers of the Pigeon (a worthless Homer) were discovered to be smeared with poison. No doubt it was sent up by a Pigeon-fancier, in hopes of getting rid of some of his winged vermin; but this victim was found in time, and has completely recovered. I hope to induce its owner to release it. Buzzards can be seen in the woods near Ilfracombe, Lynton, Barnstaple, and along the sea-cliffs at Baggy Point, Hele, and Combe Martin.

31st.—Watched a brood of Sheld-Ducks. They were about the size of Little Grebes or smaller, white, brownish black on the head, and dull brown blotches on the body, with the chest white, and bill lead-colour. They dive with ease, much to the discomfort of the attentive hen-bird. When under water they only use their feet, the wings being kept close in to the body; the legs and feet are worked forwards and backwards, reaching far out beyond the extremity of the tail in the backward motion. To an observer watching their movements when diving, these little birds present a weird appearance. They look perhaps more like Hippocampi, or Sea-Horses, than anything else, or like huge Frogs. As soon as they reach the surface they become, as if by magic, transformed into little Sheld-Ducks again.

June 4th.—At Croyde Bay picked up a fresh specimen of the Manx Shearwater, washed in by the tide. The colony of Herring-Gulls at Baggy Point is in a very thriving condition, and large numbers of Gulls are now nesting there. We noticed also a pair of Lesser Black-backs on the cliffs with a nest and three eggs, which the hen-bird was brooding. Apparently the eggs of the Lesser Black-back and those of the Herring-Gull are exactly similar.

9th.—Red-backed Shrike with six young birds in a thorn-bush at Braunton.

July 18th.—Golden-crested Wren sitting on five fresh eggs in a larch-tree.

August 22nd.—Visited Lundy Island. Puffins have gone, Guillemots and Kittiwakes numerous, and a large flock of Terns.

28th.—At Lundy again. All the birds except the Herring-Gulls departed.

September 14th.—A few Whimbrel on the Taw; also a pair of Greenshanks—a rare bird in North Devon. Rescued an exhausted Guillemot from the river to-day. It could not move any part of its body except its neck, which it feebly turned round when I approached it from behind. Three weeks after this a Heron was brought to me, which had been caught when in apparently the same helpless condition. It was extremely emaciated. I cannot account for this, as the weather has been very mild here up to the present.

18th.—Common Gulls in some numbers on the river. A Curlew-Sandpiper has been frequenting the Taw for some weeks past. It was very tame, allowing me to examine it well. Redshanks and Bar-tailed Godwit fairly plentiful this year, but the former is never common, and is much rarer than it used to be.

30th.—A Little Stint has been shot on the river near Barnstaple, and a Puffin in the bay near Appledore. Razorbills and Guillemots are seen commonly in the summer months off the north coast of Devon, but Puffins rarely, and none of them so late in the year as was this specimen. Little Grebes and Kingfishers returned to the estuary to winter.

October 12th.—A Cormorant shot at Black Torrington, about twelve miles from the coast; it was discovered by some local gunners perched on the church-tower, some sixty feet high.

13th.—A Green Sandpiper for a fortnight past has been observed continually on the ponds and guts in the marshes adjoining the river near Fremington.

14th.—The Kingfisher has to alter its tactics when fishing in the estuary. There are no convenient boughs where it can sit and watch, so it hovers over the water after the fashion of the Kestrel, and on seeing a fish darts down in the usual manner. I saw a pair off the coast at Down End Point, Santon, fishing in this way. They were very noisy, screaming continually, and seemed to be quite unaccustomed to the big waves. They often had to move suddenly to escape a severe ducking. It was strange to see this inland bird at the seaside, but North Devon scenery is noted for its wonderful combination of sylvan beauty with the splendour of the beetling sea-cliffs. At Heddon's Mouth, where a little mountain stream empties itself into the sea, I have seen even Dippers perched about on the boulders on the shore.

21st.—Two Little Stints on the river. They remained till about Nov. 12th.

November 18th. — Stormy. Four Grey Phalaropes on the mud-flats off Pottington Point.

December 27th.—A rather heavy fall of snow, causing an immense number of birds to seek the shelter of the valleys. Peewits were in thousands, and hundreds were shot. Golden Plover, Thrushes, Redwings, Starlings, and Fieldfares in very large flocks. The latter bird is not often seen here except after extreme cold. Several Bramblings with the Chaffinches at Tawstock Woods, and there were one or two small flocks of them near Knowle, Braunton. A few Wild Geese seen flying westwards over the estuary of the Taw.

NOTES AND QUERIES.

MAMMALIA.

An Apparent Instance of the Hereditary Transmission of a Mutilation in the Domestic Cat.—When lately on a visit to a connection of mine, who lives at Penn Grove, Hereford, I noticed a yellow tom-Cat, apparently tailless, but found that there existed a short stump, scarcely noticeable. On enquiry I learned the following particulars:—His mother was of a tortoiseshell colour, and belonged also to my friend, and was born at the house with a full-sized tail, which was bitten off when she was a kitten of from twelve to fourteen days old. His father's tail was of full length, but was broken in a door, and, though not truncated, became thenceforward limp and trailing. In due course of time the tortoiseshell-Cat gave birth to a single kitten (the above yellow tom-Cat that I saw), which when born had only a mere vestige of a tail as at present. The mother was then lost, so that no particulars can be given as to any subsequent progeny she may have had. The owner of these Cats is unaware of there having been any Manx strain in either parent, both of whom, however, as I have above stated, had been provided with the normal appendage; nor was it known that any Manx Cats had lived in the neighbourhood. Further than this, it is a remarkable fact that I find the yellow tailless tom-Cat to which I refer, son of these two mutilated parents, was the father of three kittens last year by a Cat who is provided with a proper tail, two of which kittens were born without tails, and the third, like its mother, with a tail.—W. F. de Vismes Kane (Drumleaske House, Monaghan).

Stoat and Ferret Hybrids.—Mr. G. T. Rope will find his queries (Zool. 1906, p. 468) to some extent answered, if he will refer to P.Z.S. 1899, p. 2. Portraits of a specimen (in my collection) are published in 'Eton Nature-Study and Observational Lessons,' by Messrs. M. D. Hill, M.A., and W. M. Webb, F.L.S. (London: Duckworth & Co., 1903), vol. i. p. 87, from photographs specially taken for that work, under the direction of Mr. Webb; and these portraits are reproduced in an article by Mr. Webb in a magazine entitled 'The World's Work and Play' (Heinemann) for April, 1906. In March and April, 1899, I sent specimens which had died to Mr. F. G. Parsons, F.L.S., &c., of St. Thomas's Hospital, who was good enough to take a great deal of trouble in the endeavour to arrive at a conclusion as to their pedigree by dissection, but unfortunately without any very definite result. So far as it goes, however, it is against their hybrid origin. In September of the above year, Mr. Parsons wrote:—"I have carefully examined the soft parts of several Stoats, Polecats, and Ferrets, as well as your suspected hybrids. Unfortunately the anatomy of these animals is so much alike that I have only negative results. Once or twice I have thought that I had found a definite anatomical difference, but on dissecting other animals of the same species I have found that it was merely an individual variation. The result of all this work so far is that I have acquired an accurate knowledge of the anatomy of these Mustelidæ, and am impressed with the near relationship between the Stoats and Ferrets. In consequence of this I am quite ready to believe that these animals might breed together." Mr. Parsons goes on to say that he was in hopes that some result might be obtained from the osteology, and was therefore having skeletons prepared. In November of the same year Mr. Parsons wrote:—"I have now had the bones of your specimens prepared, and have carefully compared them. The hybrids you sent correspond in every particular to Polecats, and have no Stoat-like characteristics. I have taken the skull to Mr. Oldfield Thomas, ... who compared it with a large collection, and was quite of my opinion. There is one point in which the soft parts of Stoats and Polecats differed materially, and that was in the proportionate length of the intestine to the body length. In three Stoats the intestine was 3·5, 3·75, 3·4 times as long as the body. In two Polecats it was 4·8 and 4·7 times as long. In one Ferret it was 5·7 as long. In your hybrid (one was too decomposed) it was 4·7, again corresponding closely with the Polecat. Of course this does not disprove the fact that a Stoat may have had something to do with their origin, only that no Stoat-like characters (as far as I can tell) have been transmitted." A great number of people, including some thoroughly "competent naturalists," have seen specimens in my menagerie in the course of the last nine years, but I should not feel at liberty to quote, even if I remembered accurately, the opinion of each; but I may say that I have received many most eulogistic "unsolicited testimonials" concerning examples which I have sent away, while only in four instances has any doubt been expressed as to their being really of hybrid origin. If Mr. Rope, or any other brother "naturalist," can find his way here (when the days are somewhat longer and more genial), I shall be delighted to let them form their own opinions from such examples as I may then possess. — Alfred Heneage Cocks (Poynetts, Skirmett, near Henley-on-Thames).

Is the Weasel a Native of Ireland?—A period of twenty-nine years has now elapsed since this question was discussed in the pages of 'The Zoologist' for 1877, and yet, up to the present date, has not been decided in the affirmative, because none of the persons who alleged they had seen Weasels in Ireland have sustained and corroborated their statements by the production of an Irish-killed specimen in the flesh, with an authentic record of the dates and localities of capture. While in proof of its not being a native, we have the fact of there not being a specimen in any of the public museums, nor, as far as I am aware of, in any private collection either; and also our best naturalists did not believe in its being a native. The late Dr. Ball, (I believe the first) Director of the Dublin Museum, never saw an Irish specimen. Neither did the late William Thompson, of Belfast, who, writing to me as far back as Sept. 28th, 1851, says: "The Weasel is not known as an Irish animal." My old and valued friends, the late Dr. A. Carte and Mr. A. G. More, both for many years Directors of the Dublin Museum, never saw one. Neither did my old friend Dr. J. R. Harvey, of Cork, who during a long life accumulated the finest collection of natural history specimens in the South of Ireland; and he, writing to me in September, 1877, says: "I never saw the Weasel in Ireland, and I don't believe we have it. I have had over and over again to prove to people that what they thought to be Weasels were in reality Stoats, and, like yourself, have still to look for the pleasure of beholding an Irish Weasel." So the matter rested in 1877. However, in 'The Zoologist' for 1894, the question again turned up in a very interesting article by Mr. J. E. Harting, "On the Weasel and its Habits" (pages 417 and 445), when, after speaking of it in England and Scotland, he quotes from letters of various correspondents asserting they had seen Weasels in various parts of Ireland—some promising specimens, but, as far as I am aware, none were produced in evidence of their statements. I have never met a specimen myself, and have questioned shooting men, keepers, rabbit-trappers, &c., in various parts of the country, but never could obtain satisfactory proof of a Weasel being obtained by any of them. However, as rabbit-trapping has become so universal and widespread for the past thirty years throughout Ireland wherever there are burrows of any extent, it is manifestly impossible that this little animal could exist in the country without some specimens being taken along with the numbers of Stoats trapped every season.—Robert Warren (Moy View, Ballina).

Otters in the Hampshire Avon.—Twice during 1906—*viz.* spring and autumn—the Otter-hounds visited this neighbourhood, and, although comparatively unsuccessful in their quest, as far as "killing" is concerned, it must not be supposed that Otters have become scarce. Possibly the river is unsuitable for hunting, either from its depth or width or currents, but for some reason best known to the "craft" the waters of the Avon are not hunted, and it is the smaller streams or brooks to which the "sport" is confined; but the banks of the main stream often bear unmistakable traces of the so-called "sly, goose-footed prowler," and it is not long since two young Otters—larger than terriers—were caught in a garden near the river, and their "holt" was discovered not far off underneath one of the bridges close to Ringwood. During August and September I knew of three Otters—two males and a female—having been either shot or trapped within a mile of each other, the smallest weighing eighteen pounds, whilst the largest turned the scale at twenty-seven pounds, and measured fifty-one inches in length; and on one occasion a duck-shooter, whilst waiting in the "gloaming" for the evening flight, saw two large Otters swimming and diving in the water only a few yards from him. A short time ago a local newspaper contained an account of a prolonged and fierce battle which took place, one morning in October, between two large Otters, in the river at Fordingbridge, and was witnessed by a number of spectators, who watched the fight for nearly an hour, the combatants still continuing the encounter as they passed down the stream, beneath the bridge on which the people were standing. These were stated to be two dog Otters weighing twenty-five pounds each, but how the sex or weight was ascertained it saith not.—G. B. CORBIN (Ringwood).

Common Seal on the Coast of Somerset.—On Dec. 17th last I saw a full-grown Common Seal (*Phoca vitulina*) close into the rocks here at high tide. Seals on this part of the Somerset coast are, I believe, of very rare occurrence.—H. MEYRICK (Clevedon, Somerset).

AVES.

Ring-Ouzel in Surrey.—With reference to Mr. Mouritz's note on the Ring-Ouzel seen in Richmond Park on Sept. 10th, 1905 (Zool. 1906, p. 434), my own records of the bird's appearance in Surrey during that year may be of interest. They are as follows:—On April 29th I noticed a Ring-Ouzel on the common-land in the neighbourhood of Chart. The bird was very wild, and on my approach flew away into some pine-woods, where I lost sight of it. On Sept. 24th I again met with the species, when a single bird was observed among some tall bushes growing near a mill-pond at Oxted. A week later two birds (I think a pair) were noticed on the North Downs, near Woldingham. These autumn migrants were quite as wild as the bird seen near Chart in the spring, but those on the downs I was able to watch through a glass for a considerable time, owing to the open nature of the country they were frequenting. Very rarely did any of these Ring-Ouzels turn the white breast-band towards me when they alighted, as if aware of its conspicuous appearance. I agree with Mr. Mouritz that this Thrush is a very rare visitor to Surrey, for, although I have rambled about a good deal in different parts of the county, until last year I had never met with the species. Although I have watched carefully for the bird during the present year (1906), I am unable to record a single instance of its appearance.—C. H. Bentham ("Keymer," East Hill Road, Oxted, Surrey).

Chaffinches, Greenfinches, and Yellowhammers.—With reference to Mr. Robert Warren's interesting account of the "Disappearance of many of our Home-bred Birds in Autumn" (Zool. 1906, p. 459), I have for some years observed the disappearance in autumn—generally about the latter part of September—of local-bred Chaffinches, Greenfinches, and Yellowhammers in this part of Northumberland, to be followed later by an influx of others, evidently of a more northern race. I have also noticed that during the winter months there are far more male Chaffinches to be seen than females, and I believe it was owing to this that Linnæus named it *cœlebs*, or "bachelor finch." About the latter part of October we often have large flocks of Greenfinches, but they soon disappear, or become dispersed. — J. S. T. Walton (Sunniside, Stocksfield-on-Tyne).

Arctic Redpoll (Linota hornemanni) in Midlothian.—On Dec. 29th, 1906, I had a brief but clear glimpse of an Arctic Redpoll as it flew northward over a clearing on a wooded hill near Edinburgh. The lower parts were white, the flanks unstriped, and the upper parts, when they came into view, had a greyish white appearance. The occurrence of this representative of an arctic species, coupled with the unusual arrival of some Mealy Redpolls at the same place, after a period of northerly gales and severe snowstorms, is not without significance.—J. M. Dewar (24, Lauriston Place, Edinburgh).

Short-eared Owl in Staffordshire.—Authentic records of the Short-eared Owl in Staffordshire are few. Mr. E. Brown says (1863), "Many killed in the Burton district at beginning of winter" ('Nat.

Hist. of Tutbury,' p. 92). Garner only says, "frequent" ('Nat. Hist. of Staffordshire,' p. 272), and Dr. McAldowie gives a few instances only ('Birds of Staffordshire,' p. 88); so that a recent occurrence of this bird in the county is worth recording. On Dec. 19th last, when cover-shooting at Whiston Eaves, near Cheadle, a bird of this species was flushed from off the ground by one of the beaters, and identified by Mr. E. W. H. Blagg and myself as a Short-eared Owl (*Asio accipitrinus*, Pallas). The bird was, I am happy to say, not shot at.—John R. B. Masefield (Rosehill, Cheadle, Staffordshire).

Pernis apivorus in Montgomeryshire.—An immature female Honey-Buzzard was inadvertently shot by a keeper at Kerry, near Montgomery, on June 21st, 1906. This is the only example recorded in the county, and in the whole of North Wales the species has been known to occur only seven or eight times.—H. E. Forrest.

Gadwall (Anas strepera) in Shropshire.—On Dec. 9th last there was a drake Gadwall on the lake in Hawkstone Park. It was swimming with a small party of Mallards about fifty yards from where I stood. At that distance the close wavy markings on the neck, mantle, and sides of the body suggested a general dark cinereous coloration, with which the intense black of the upper and lower tail-coverts contrasted strongly. Whilst the bird was on the water the white speculum was not noticeable, concealed as it probably was by the cinereous feathers of the flanks, but as it got on the wing the white spot showed very clearly, and the black rump and tail-coverts, being then more exposed, made a still stronger contrast with the general plumage than they had done before.—Chas. Oldham (Knutsford).

Hybrid Pheasant.—That the Common Pheasant often interbreeds with other or closely allied species is well known, but the following note may be of interest. During a shooting on an estate near here a peculiar looking bird was killed, which was, I suspect, a hybrid between Pheasant and ordinary fowl, although the gentleman who shot it had an idea that Pheasant and Black Grouse were indicated in the bird, but I could see no traces of Grouse, and the feet and legs were decidedly Pheasant or fowl. The bird in question was a very small immature male, and the plumage was too tattered for setting up. The front of the neck, breast, and under parts were black, many of the feathers having buff edges and shafts, whilst a few were barred alternately with buff and black; back, wings, and back of neck were of varied shades of brown, some feathers having the dark central brown mark so observable in the hen Pheasant, but the cheeks were conspicuously red. The shape of the tail was the most remarkable, as it was short, like that of an ordinary bantam hen, and resembled the back in colour, or perhaps a trifle darker. It probably would have been a singular looking bird if it had been allowed to live and attain its full plumage.—G. B. Corbin (Ringwood).

Larus melanocephalus in Cornwall: unrecorded Examples.—Recently, when visiting the collection of birds from Hawkstone (now in the possession of Mr. Beville Stanier, of Peplow Hall, Salop), I came across two examples of the Mediterranean Black-headed Gull. They are described in the manuscript catalogue by Harry Shaw as follows:—"The pair of birds in this collection were killed near Falmouth in March, 1851; the only specimens of their kind recorded as obtained in this country." It is strange that Shaw never communicated this rare occurrence to the editors of the later edition of 'Yarrell,' in which book the specimen obtained near London in 1866 is mentioned as being the earliest record. Similar statements appear in Mr. Howard Saunders's 'Manual,' and other recognized text-books on British Birds, whilst the name of this species does not appear in Mr. Rodd's list of the Birds of Cornwall.—H. E. Forrest.

Westward Movement of Birds during Snow.—The late snow, with harsh wind, commenced in Co. Waterford on the night of Dec. 25th, 1906, and for the next four days flights and single birds passed all through each day, consisting chiefly of Redwings and Fieldfares, with many flocks of Sky-Larks and Lapwings. They were all hastening to the west. The frost was terminated on Dec. 30th by rain and a thaw, and the movement of birds ceased. I should like to know if a similar rush of birds has been observed along the south coasts of England towards Devon and Cornwall. I have repeatedly observed such a wholesale westward movement of birds here on the occurrence of severe frost and snow, which is an irregular, if not an exceptional, event in the South of Ireland. Our synclinal valleys run east and west, and thus lend themselves to the passage of birds towards Kerry, a county more affected by the Gulf Stream and the westerly winds, and consequently less frost-bound in winter.—R. J. Ussher (Cappagh, Co. Waterford).

PISCES.

Sea-Lamprey at Shrewsbury.—A specimen of the Sea-Lamprey (*Petromyzon marinus*) was taken in the Severn below the Welsh Bridge, Shrewsbury, on July 23rd, 1906; it is now in Shrewsbury Museum. It weighed just two pounds, and measured 2½ ft. Before the construction of navigation weirs lower down the river the Lamprey used frequently to ascend the Severn even beyond the Welsh border, but it is now of very rare occurrence, though another was taken in exactly the same spot as the above in June, 1899.—H. E. Forrest.

INSECTA.

The Mole-Cricket (Gryllotalpa vulgaris) in Dorset.—In response to the request, on p. 437 of the last volume of this magazine, for records of the occurrence of the Mole-Cricket in England, I may mention that specimens have been brought to me very occasionally from various parts of the Isle of Purbeck, Dorset, in which it is evidently widely distributed. The last example I received was captured therein on June 1st, 1903, and caused some excitement, for, after gnawing a hole through the stout piece of cotton-rag covering the glass jar in which it arrived (the jar had been laid on its side), it jumped off the top of a cabinet, four feet high, on to the floor, and was rapidly making for a sanctum behind the furniture when its recapture was fortunately accomplished.—Eustace R. Bankes (Norden, Corfe Castle).

NOTICES OF NEW BOOKS.

The Mammals of Great Britain and Ireland. By J. G. Millais, F.Z.S. Vol. III. Longmans, Green & Co.

The completion of this great work marks an epoch in British zoological literature; it brings the subject up to date; is written by one who as sportsman and naturalist has seen much of what he records; and it has set the standard of illustration. These three huge volumes are, as many will find, somewhat expensive in cost, but are at the same time, according to our view, in actual artistic value, exceedingly cheap. No future work on British mammals is possible without a reference to Millais.

The Hare receives full treatment, and its aquatic habits are fully recorded. We should have been glad to have found such material when studying the swimming capacities of these and kindred animals a few years back. But many other peculiarities of this creature are not of general knowledge, especially to those whose experience is principally related to shooting or coursing. "Farmers can always tell whether Hares or Rabbits have been attacking turnips. Hares will peel off the outer skin and leave it on the ground, but Rabbits will eat skin and all." The Irish Hare is treated as a subspecies of the Mountain Hare, under the name of *Lepus timidus hibernicus.*

In discussing the distribution of the Rabbit, Mr. Millais inclines to the theory of Prof. Scharff, that the animal originated somewhere in or near North America, which necessitates the consideration of "the lost Atlantis," a postulate receiving much support at the present day from other arguments than those of zoology alone. Lost continents with their lost civilizations have a most important evolutionary signification, and are the burial-places of many "keys" and many "links." With the Mammoth we get back in England to some fifteen thousand years ago, and in Ireland to a later date, where it "still lives in legend and story among the more superstitious." Of the drawings of this beast, made by prehistoric man on cave-walls at Combarelles, in France, some twenty thousand years ago, Mr. Millais adds a note that they "are a good deal better than many pictures of wild animals by modern artists, although they are not 'as good as Landseer,' as one art critic described them."

The Deer occupy many pages, as might be expected from one who has already written on 'British Deer and their Horns." Mr. Millais joins issue with the opinions of Mr. Lydekker and the late Sir William Flower, "that when the growth of the antler is complete, the supply of blood to it ceases, the skin dies and peels off, leaving the bone bare and insensible, and after a time, by a process of absorption near the base, it becomes detached from the skull, and is shed," &c. Mr. Millais writes:—"Having given much attention to this growth of antlers, and having killed many Stags at all stages of their horn-growth, I must differ entirely from this view, and can state definitely that it is erroneous." The reader will also find much argument as to the subspecific splitting of these animals, which merit the deepest consideration, whatever opinion may be ultimately held; in fact, we find ourselves in Wild Deer exactly in the crux of Wild Geese, so far as taxonomy is concerned. We can only give one paragraph from Mr. Millais:—"No deerstalker, for instance, who has been much associated with Red Deer, whether in Eastern or Western Europe, would found specific or subspecific distinctions on local variation in bodily size, colour, or antlers, being well aware that these are all exceedingly variable characters, not only among individual Stags in the same neighbourhood, but even in the same herd. It is clear, however, that Dr. Botezat's classification of Red Deer in Carpathia has been wholly based upon such characters, selected incidentally, no doubt, from a few specimens in which they are more or less strongly marked. I feel quite sure that in the Scotch island of Jura, thirty miles long, I could select three Stags which, to a zoologist of Dr. Botezat's school, who had never previously seen a Scotch Stag, would constitute quite as good sub-species as the 'short-faced Red Stag,' 'black mountain Stag,' and 'large grey lowland Stag,'" &c.

The *Bovidæ* are beyond the limits of our space to adequately notice, but we may draw attention to a reproduction of Sir E. Landseer's well-known "Chillingham Cattle."

It is, however, with the description of the Cetacea that this volume is almost unique. Mr. Millais has gone to sea to observe them, and, what is almost more, to illustrate them. We are introduced again to a great industry which has produced skilled and hardy mariners based on the old human instincts of sport and adventure. Of the old whaling days, in sailing-ship with hand-harpoon, little remains, and little is recorded; now we have the steamship and the gun! Almost as great a contrast as between the old 'Victory' and the modern 'Dreadnought.' But whatever might have been written then, could only have been adequately illustrated by the modern methods of to-day. We have seen these creatures during the last forty years in all parts of the world; we have, however, only just seen in this volume a reproduction of a photograph by the Earl of March of Common Dolphins at sea, and have at last on our bookshelf a faithful representation of an old experience.

The Aquatic Birds of Great Britain and Ireland. By CHARLES J. PATTEN, M.A., M.D., Sc.D., &c. R. H. Porter.

ONE of the greatest difficulties experienced in the composition of this interesting book must have been connected with its title. What really constitutes an aquatic bird? There are several included in this enumeration which would probably not receive universal acceptance in such a category. Thus we have the Bustards, which to some will appear as little entitled to the character of aquatic birds as would have been the Kingfisher had that bird been inserted. We make these remarks in no captious spirit, but as showing that the title of the book as applied to some birds it includes appears to be very elastic.

Dr. Patten has written this book from the bed-rock of much personal observation, and has consulted considerable trustworthy authority; it is amply illustrated, and contains some characteristic views of the haunts of shore-birds. Many of the records relate to Ireland.

EDITORIAL GLEANINGS.

Though the tropical heat and drought of the summer often greatly interfered with sport, and water and weather conditions at other times have been unfavourable, anglers have made some notable captures in the past year in river and lake, and large fish have been met with in salt water.

In the Thames numbers of good Trout and other fish have been taken. Landed by Mr. A. E. Hobbs in the Henley waters, the largest Trout scaled 9 lb. 1 oz. Pike up to 22 lb. have been captured, also Chub of 5½ lb. and 5 lb. 5 oz., an 8¼ lb. Carp (Egham), and some fine Barbel, the season for these fish showing an improvement on 1905. Thames Roach fishing has not been up to the average. The largest authenticated Roach of the season—one of 2 lb. 7 oz.—has been captured in the Lea at Ponders End by Mr. Strickland.

One of the finest Salmon landed in Scotland was a specimen of 43 lb., which was secured by Mrs. Arthur Sassoon, in the Earn. The Wye and Usk have furnished some good Salmon this season, and near Ringwood (Hampshire), Mr. A. G. Campbell established an Avon record for one day by landing six fish scaling 143 lb.

The best Pike hail from Ireland and Wales—two thirty pounders; one was taken in the Wye. The past year will be memorable among Chub anglers as yielding the largest specimen of this fish ever known to have been taken with rod and line. It fell to the rod of Mr. F. W. Smith, fishing in the Avon (Hampshire), and now ornaments a glass-case. It scaled 7 lb. 6½ oz.

Wargrave-on-Thames and the Witham, near Boston, Lincolnshire, have each yielded specimen Bream of 6 lb. 2 oz.—fine fish—and some large Perch and Dace have been met with in various waters. Grand Roach up to 2 lb. 4 oz. have been caught by London anglers in the tidal Arun at Amberley, Sussex.

With reference to big fish caught by sea anglers, the Californian waters are an easy first. One angler at Santa Catalina Island has landed a black Sea Bass of 327 lb. on a light rod.

Mr. Holcombe, of the British Sea Anglers' Society, has probably taken the largest fish in our waters—a huge Skate of 183 lb., landed at Ballycotton, Co. Cork coast. Here a splendid Cod of 30 lb. has fallen to the rod of Mr. J. N. Hearn, another member. Fine Pollack, Bream, and Bass has been taken in Sussex and Kentish waters, and one of the catches here was a 34 lb. "Angler" Fish (*Lophius piscatorius*), which fell to the rod of Dr. FitzGerald at Folkestone. The autumn and winter Silver Whiting season has been a disappointing one in a general way.—(*Daily Chronicle*, January 7th.)

We have received No. 1, vol. i. of 'The Hastings and East Sussex Naturalist,' dated November 1st, 1906. In some Annual Notes on the Local Fauna, &c., by the Rev. E. N. Bloomfield, we read:—"Mr. Butterfield has informed me that a very large Fox Shark, *Alopias vulpes*, Penn., 12 feet long, was exhibited in Hastings some months ago, and a Torpedo, *T. nobiliana*, Bonap., was taken in August by one of the Hastings fishing-boats."

In the 'Bradford Scientific Journal' for this month, Mr. H. B. Booth gives the following record:—"During the third week in December a large fish, on view at the game shop of Mr. W. L. Blakeley, Horton Road, Bradford, attracted considerable attention. It was supposed at the time to be a Salmon hybrid, and it was stated that none of the fisher-folk at Grimsby had ever seen one like it before. The local evening papers of December 17th described it as a large fish, with the head of a Salmon, the body of a Porpoise, and the tail of a Shark. I recognized it as one of the larger species of the *Scombridæ* (Mackerels), and with the aid of 'Our Country's Fishes' I was able to identify it with certainty as the Short-finned Tunny (*Orcynus thynnus*), a rare fish in British seas. Its length was 45½ inches, greatest girth about 30 in., and weighed nearly one hundred pounds. Mr. F. King, of Grimsby, who sent the fish to Bradford, writes to say that it was caught on Dec. 10th, five miles to north-east of the Dogger Bank."

In the Ann. & Mag. Nat. Hist. (7), xviii. p. 327, Lieut.-Col. Durnford has published a second paper on the "Flying-fish Problem." He refers to a recent article in these pages as follows:—

Lionel E. Adams, B.A., writes in 'The Zoologist' (April 4th, 1906) an article interesting throughout. I quote from p. 146: ". . . . I was often able to see them against the sky. . . . I could see quite distinctly that their tails were vibrating very rapidly from side to side during the whole flight, and that the wings would vibrate with an intensely rapid shivering motion for a second, then remain outspread motionless for one or two seconds, and then vibrate again. This vibration of the wings is not up and down as in the case when birds fly, but in an almost horizontal direction." That is a quite possible explanation of the mode of flight, provided that a sufficient speed be acquired in the intermediate flappings, but this the known speed of the fish shows to be not commonly the case.

Again, on p. 148: "I am perfectly well aware that a casual glance at Flying-fish from the lofty deck of a liner gives the impression that they soar like birds with motionless wings, but watch them at close quarters from the deck of a low-waisted tramp, and the vibratory motion of the tail and fins will be quite plain."

Interesting as is Mr. Adams's paper, I cannot but think that he is partly mistaken in his views, and that the wing-vibration which he discerned was really less rapid than the movement in the period following which he believed to be one of stillness, just as the liner-passengers mistook his vibrations for stillness. I do not say that the fish could never arrive at a speed by which a very short aeroplane flight could be attained even with their low ratio; but I do say that such is not their common speed, and that in any case their disregard of wind-direction disproves such flight. Therefore another way must be looked for, and we are driven back, perforce, to continuous wing-action, the manner of which may be here examined as carefully as our information allows.

Premising that the flight varies greatly on different days and under different conditions, the following is probably a fair description of their methods in an ordinary flight:—

1. The tail-impelled, visibly (to many) wing-assisted jump from the water to a height where the wings can work freely.

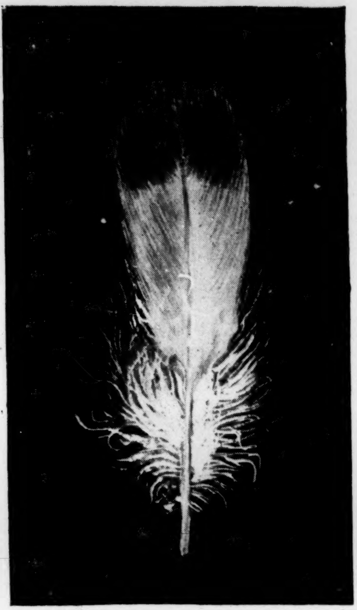
2. The flight continued by an intensely rapid and laboured wing-movement—one easily mistaken for stillness, and usually seen, if at all, as blurr.

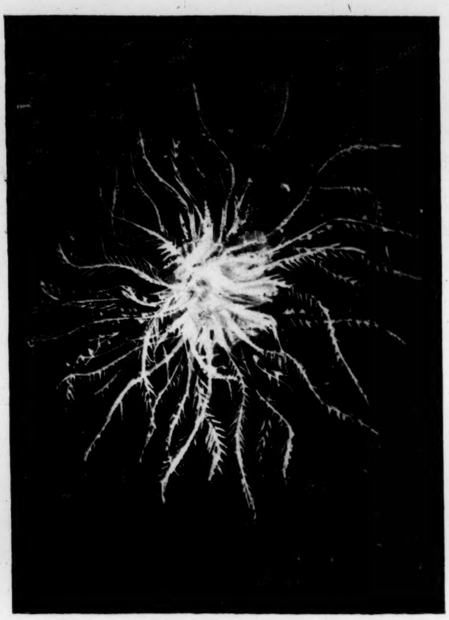
3. Short periods of slowing down of wing-speed, during which the wing-movement becomes again visible. (These are the "vibration" periods, representing to aeroplanists loose wing-trailing, or dragging like a flapping flag—an impossibility; and, to Mr. Adams, periods of wing-assistance—with limitations a possibility.) These periods often precede a special spurt such as is required to lift the fish over an on-coming wave.

4. Either sudden cessation of wing-movement and consequent immediate drop into the sea, or a short slow down into visibility (No. 3) previous to such drop.

It is to be noted that this vibration so often seen before the fish enters the water is one of the many pointers to continuous wing-movement, for such a time is a proper one for slowing down, but an absurd one for renewal of wing-effort.

1





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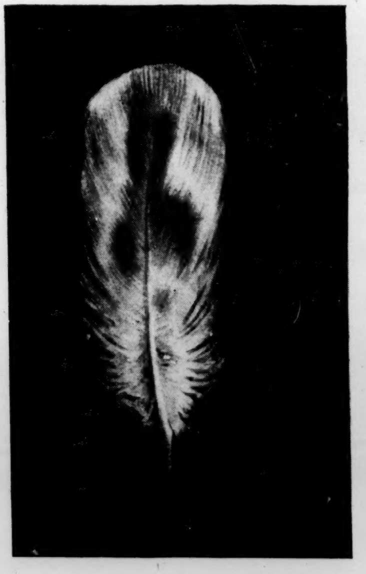

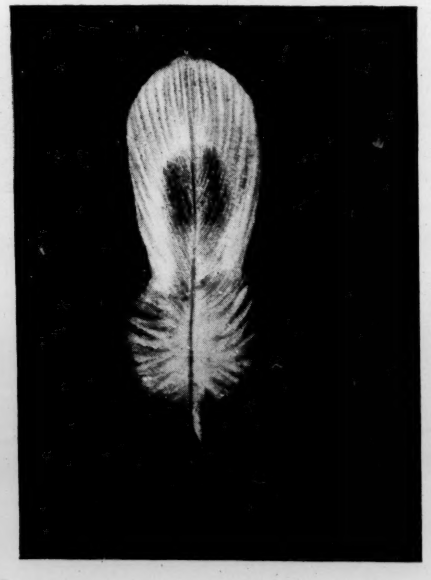

4

(From drawings by Miss Barling).

1. Contour feather from breast of Sheld-Duck.
2. Down of Sheld-Duck.
3. Contour feather from breast of Mallard.
4. Contour feather from breast of Shoveler.